

# *CLETOPONTIUS TITANUS* NEW SPECIES, A NEW SIPHONOSTOMATOID (CRUSTACEA: COPEPODA) ASSOCIATED WITH SPONGES FROM BRAZIL

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## ABSTRACT

The previously monotypic genus *Cletopontius*, from Ceylon, now has a second species, described recorded from the Atlantic Ocean. *Cletopontius serratus* n. sp. was found associated with sponges from the Brazilian coast. Besides the absence of the endopod of P4, which is characteristic of the genus, *C. serratus* n. sp. shows a stylet mandible with a triangularly enlarged distal extremity, a 20-segmented antennule, 1-segmented antenal exopod armed with 3 setae, and an anal somite with an elongated and bifurcated plate that partially covers the caudal rami ventrally. The male *Cletopontius* is described for the first time.

Among the many studies of copepods associated with sponges (Boxshall, 1990; Malt, 1991; Stock, 1967 and Yeatman, 1970), little is known about the Asterocheridae from the Brazilian coast (Johnsson and Bustamante, in press). The genus *Cletopontius*, initially collected at Ceylon “in the general washings of dredged Invertebrates” (Thompson and Scott, 1903) included only a single species, *C. serratus*. This paper describes a new species of *Cletopontius*, associated with sponges from the Brazilian coast.

## SYSTEMATICS

Order Siphonostomatoida Thorell, 1859

Family Asterocheridae Giesbrecht, 1899

Genus *Cletopontius* Thompson & Scott, 1903

*Cletopontius titanus* new species

*Material examined*.—Holotype, 1 female (MNRJ 8140) associated with sponges from Viçosa Reefs, Abrolhos, Bahia, Brazil, collected by P. S. Young on 28/2/1994. Paratypes, 2 females (MNRJ 8141) from the same sample. 41 females and 9 males (MNRJ 8142), 4 females and 1 male USNM 282798 and 4 females and 1 male BMNH 1997.197-201 collected in the same locality in 26/VIII/1995 by P. S. Young, R. Johnsson and A. O. Bustamante.

*Description*.—FEMALE—body (Fig. 1A,B) with strongly broad prosome and short and wide urosome. Mean body length 481  $\mu\text{m}$  (434–515  $\mu\text{m}$ ) (excluding caudal setae) and greatest width 397  $\mu\text{m}$  (364–414  $\mu\text{m}$ ) based on 52 specimens. Somite of first leg with slightly pointed epimera; fused with cephalosome. Second and third pedigerous somite laterally rounded and also with slightly pointed epimera. Third pedigerous somite entirely covering pedigerous somite 4 and partially covering pedigerous somite 5. Ratio of length to width of prosome 0.9:1. Ratio of length of prosome to that of urosome 3.8:1.

Genital double-somite (Fig. 1C) wider than long,  $39 \times 89 \mu\text{m}$ , ratio of length to width 0.4:1; rounded anteriorly and with posterior corners slightly pointed. Greatest width medially, near genital openings, and with a large notch and a group of setulae close to the

genital openings. Postgenital somite wider than long,  $9 \times 43 \mu\text{m}$ , ratio of length to width 0.2:1; posterior corners pointed. Anal somite (Fig. 1C,D) wider than long,  $25 \times 37 \mu\text{m}$ , more than twice longer than preceding somite, ratio of length to width 0.7:1; lateral margins covered with setulae, posterior corners pointed and posterior-ventral margins forming elongate plate that covers caudal rami partially and has notch that reaches anal opening. Caudal rami squared,  $13 \times 13 \mu\text{m}$ , covered partially by anal somite, each with 6 setae. Outermost terminal seta  $48 \mu\text{m}$ , innermost terminal seta  $55 \mu\text{m}$ , inner dorsal seta  $97 \mu\text{m}$ , outer dorsal seta  $29 \mu\text{m}$ , two median terminal setae, outer  $73 \mu\text{m}$  and inner  $72 \mu\text{m}$ . All setae plumose.

Antennule (Fig. 1E),  $212 \mu\text{m}$  long, not including setae, 20-segmented. Basal part 9-segmented, rather broad, distal part slender. Length of segments measured along posterior margin from base: 13 ( $32 \mu\text{m}$  along anterior margin), 7, 5, 4, 6, 4, 5, 7, 9, 3, 5, 8, 13, 12, 11, 14, 15, 16, 10 and  $14 \mu\text{m}$  respectively. Segmental homologies and setation: I-2; II-1; III-1; IV-2; V-1; VI-1; VII-1; VIII-2; IX-XII-5; XIII-1; XIV-0; XV-2; XVI-2; XVII-1; XVIII-1; XIX-1; XX-2; XXI-1+ae; XXII-XXIII-2; XXIV-XXVIII-6. All setae smooth. Aesthetasc on segment XXI  $42 \mu\text{m}$  long.

Antenna (Fig. 1F)  $148 \mu\text{m}$  long (including claw) with basis  $62 \mu\text{m}$  long, with very small seta laterally. Exopod 1-segmented,  $8 \mu\text{m}$  long, armed with 2 setae apically and one seta laterally. Endopod 3-segmented, first segment  $38 \mu\text{m}$  long, second segment  $4 \mu\text{m}$ , third segment  $10 \mu\text{m}$ , more than twice longer than preceding segment and armed with small seta apically. Terminal claw  $39 \mu\text{m}$  long, curved distally.

Oral cone (Fig. 1A) pear-shaped,  $39 \mu\text{m}$  long. Mandible (Fig. 1G) comprising stylet and slender 1-segmented palp. Stylet  $83 \mu\text{m}$  long, with triangularly enlarged distal extremity; segment of mandibular palp  $27 \mu\text{m}$  with one apical plumose seta  $50 \mu\text{m}$  long. Maxillule (Fig. 1H) bilobed,  $27 \mu\text{m}$  inner lobe, almost twice longer than outer lobe and with 4 smooth setae. Outer lobe,  $14 \mu\text{m}$  long, with patch of distal setulae and 3 smooth apical setae. Maxilla (Fig. 2A) with  $68 \mu\text{m}$  long syncoxa and a curved claw  $73 \mu\text{m}$  long.

Maxilliped (Fig. 2B) 5-segmented, comprising short syncoxa, a  $70 \mu\text{m}$  long basis and a 3-segmented endopod. First endopodal segment  $14 \mu\text{m}$  long and unarmed; second endopodal segment  $11 \mu\text{m}$  long and with single seta. Third endopodal segment  $27 \mu\text{m}$  long and with 2 setae; one of them proximal and other distal, close to claw-like element which is  $33 \mu\text{m}$  long and slightly curved distally.

Swimming legs 1-3 (P1-P3, Fig. 2C,E) biramous, with 3-segmented rami throughout. P4 (Fig. 2F) with 3-segmented exopod; endopod absent. Setal formula:

	coxa	basis	exopod	endopod
P1	0-1	1-0	I-1;I-1;III-4	0-1;0-2;1-5
P2	0-1	1-0	I-1;I-1;III-4	0-1;0-1;1-5
P3	0-0	1-0	I-1;I-1;III-4	0-1;0-1;0-3
P4	0-0	1-0	I-1;I-1;III-4	_____

All base with a plumose seta. Second endopodal segment of P2 and P3 with only one seta on inner margin. Setal formula of third endopodal segment of P3 also reduced.

Fifth leg (Fig. 1C) with free segment  $31 \times 11 \mu\text{m}$ ; outer margins with row of setulae. Distally 3 plumose setae. Pedigerous somite 5 with seta near insertion of free segment.

*Diagnosis.*—MALE—body (Fig. 2G) smaller than female, with very broad prosome and short and wide urosome. Mean body length  $359 \mu\text{m}$  ( $384\text{--}343 \mu\text{m}$ ) (excluding caudal

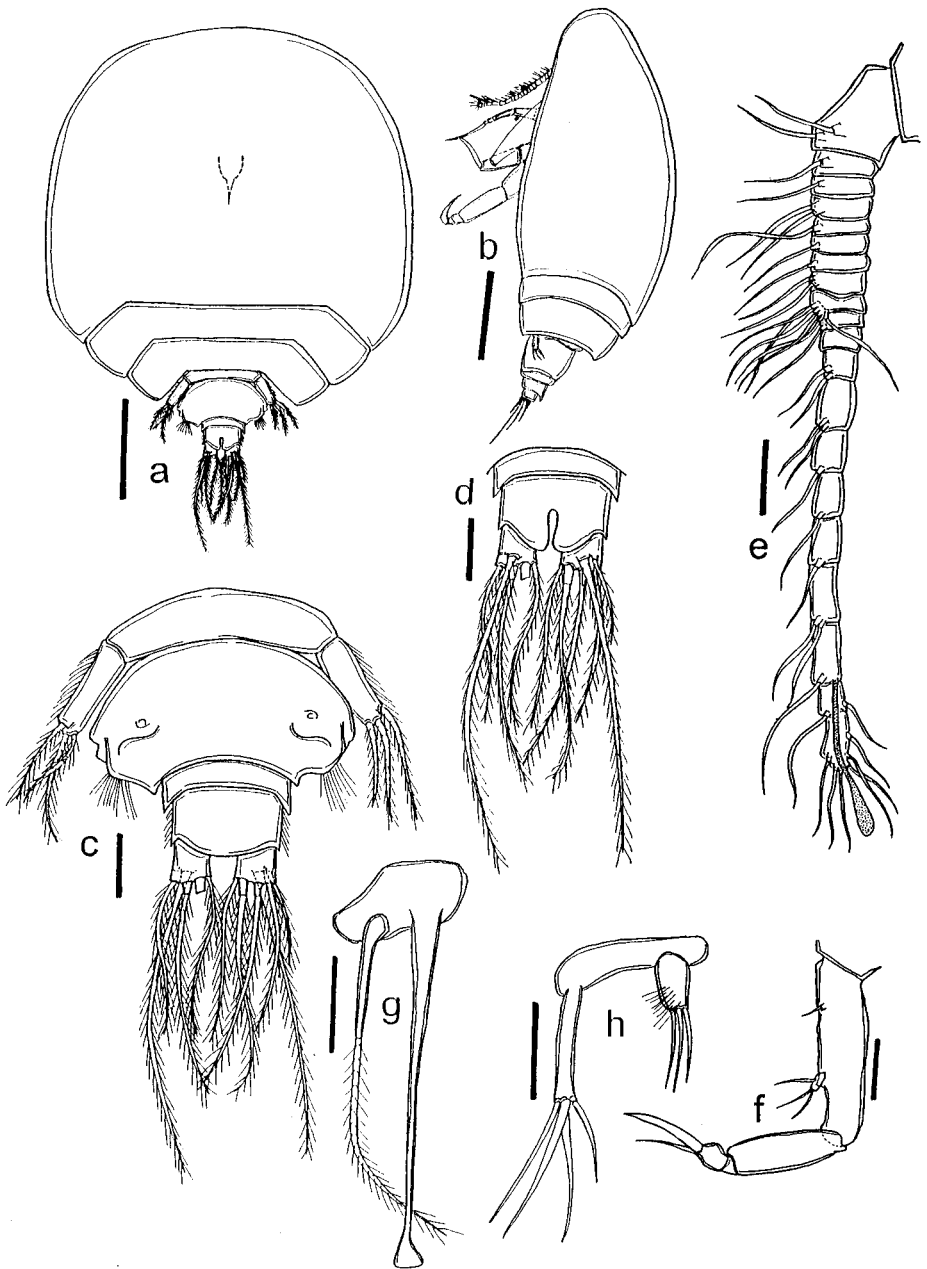


Figure 1. *Cletopontius titanus* new species. Female holotype (MNRJ 8140): a, ventral view; b, lateral view; c, urosome dorsal view; d, urosome ventral view; e, antennule; f, antenna; g, mandible; h, maxillule. Scale bars = 0.02 mm, except "a" and "b" which = 0.1 mm.

setae) and greatest width 272  $\mu\text{m}$  (263–283  $\mu\text{m}$ ) based on 11 specimens. Somite of first leg with slightly pointed epimera; fused with cephalosome. Third pedigerous somite entirely covering pedigerous somite 4. From the fifth pedigerous somite, only the free segment of leg 5 is partially visible. Ratio of length to width of prosome 1.1:1. Ratio of length of prosome to that of urosome 3.9:1.

Genital double-somite (Fig. 2H) wider than long,  $38 \times 69 \mu\text{m}$ , ratio of length to width of prosome 0.5:1, rounded anteriorly and posteriorly; two narrow projections each with a plumose distal seta extend from mid-anterior region toward the posterior corners. First post-genital somite much wider than long,  $5 \times 22 \mu\text{m}$ , ratio of length to width 0.2:1, totally covered by preceding somite and with posterior corners pointed. Second post-genital somite proportionally larger and longer than preceding somite,  $5 \times 24 \mu\text{m}$ , ratio of length to width 0.2:1, also with posterior corners pointed. Anal somite wider than long,  $15 \times 30 \mu\text{m}$ , ratio of length to width 0.5:1. Posterior margin partially covering, in midregion, caudal rami. Caudal rami wider than long,  $11 \times 14 \mu\text{m}$ , ratio of length to width 0.8:1, each with 6 setae. Outermost terminal seta 42  $\mu\text{m}$ , innermost terminal seta 46  $\mu\text{m}$ , inner dorsal seta 38  $\mu\text{m}$ , outer dorsal seta 50  $\mu\text{m}$ , and two median terminal setae, outer 58  $\mu\text{m}$  and inner 75  $\mu\text{m}$ . All setae plumose.

Antennule (Fig. 2I), 171  $\mu\text{m}$  long, not including setae, 18-segmented. Basal part 9-segmented, rather broad, distal part slender. Length of segments measured along posterior margins 17  $\mu\text{m}$  (30  $\mu\text{m}$  along anterior margin), 4, 6, 3, 6, 4, 5, 4, 8, 4, 5, 8, 13, 9, 9, 21, 16 and 13  $\mu\text{m}$  respectively. Segmental homologies and setation as follows: I-2; II-1; III-1; IV-1; V-1; VI-2; VII-1; VIII-2; IX-XIII-5; XIV-1; XV-1; XVI-1; XVII-1; XVIII-2; XIX-1; XX-1; XXI-1+ae; XXII-XXVIII-6. All setae smooth. Aesthetasc on segment XXI 52  $\mu\text{m}$  long.

All other characteristics are as in the female.

*Etymology*.—The specific name *titanus* refers to the body size of the specimen which is very large.

*Remarks*.—The genus *CletoPontius* Thompson and Scott, 1903 has, as a diagnostic characteristic, the complete absence of the endopod of P4. The authors also note that the inner branch of the posterior antennae is 2-segmented; it is possible that they were referring to the exopod (Thompson and Scott, 1903: pl. XX, fig. 11). However a 2-segmented exopod is not found elsewhere in the order and consequently requires further confirmation.

*C. titanus* is much smaller than *C. serratus*. The new species has a mean body length of 481  $\mu\text{m}$  and *C. serratus* is 0.8 mm long. Besides that, *C. serratus* has bluntly serrated lateral margins of the second and third pedigerous somites; in the new species these margins are smooth.

The antennule of female *C. serratus* is 18-segmented because of the fusion of the segments IV–VI. In *C. titanus*, the antennule is 20-segmented because this fusion does not occur. *C. titanus* presents in its antenna a 1-segmented exopod, armed with 3 setae, 2 of them distally and one laterally, while *C. serratus* bears only 2 distal setae.

There are some great differences between the two species in relation to the mandible. Although both species have a 1-segmented mandibular palp, in *C. serratus* this is armed with 2 setae, one of them long and plumose and the other short and smooth, and the stylet is needle-like. In *C. titanus* the mandibular palp bears a single plumose seta and the stylet mandible has a triangularly enlarged distal extremity.

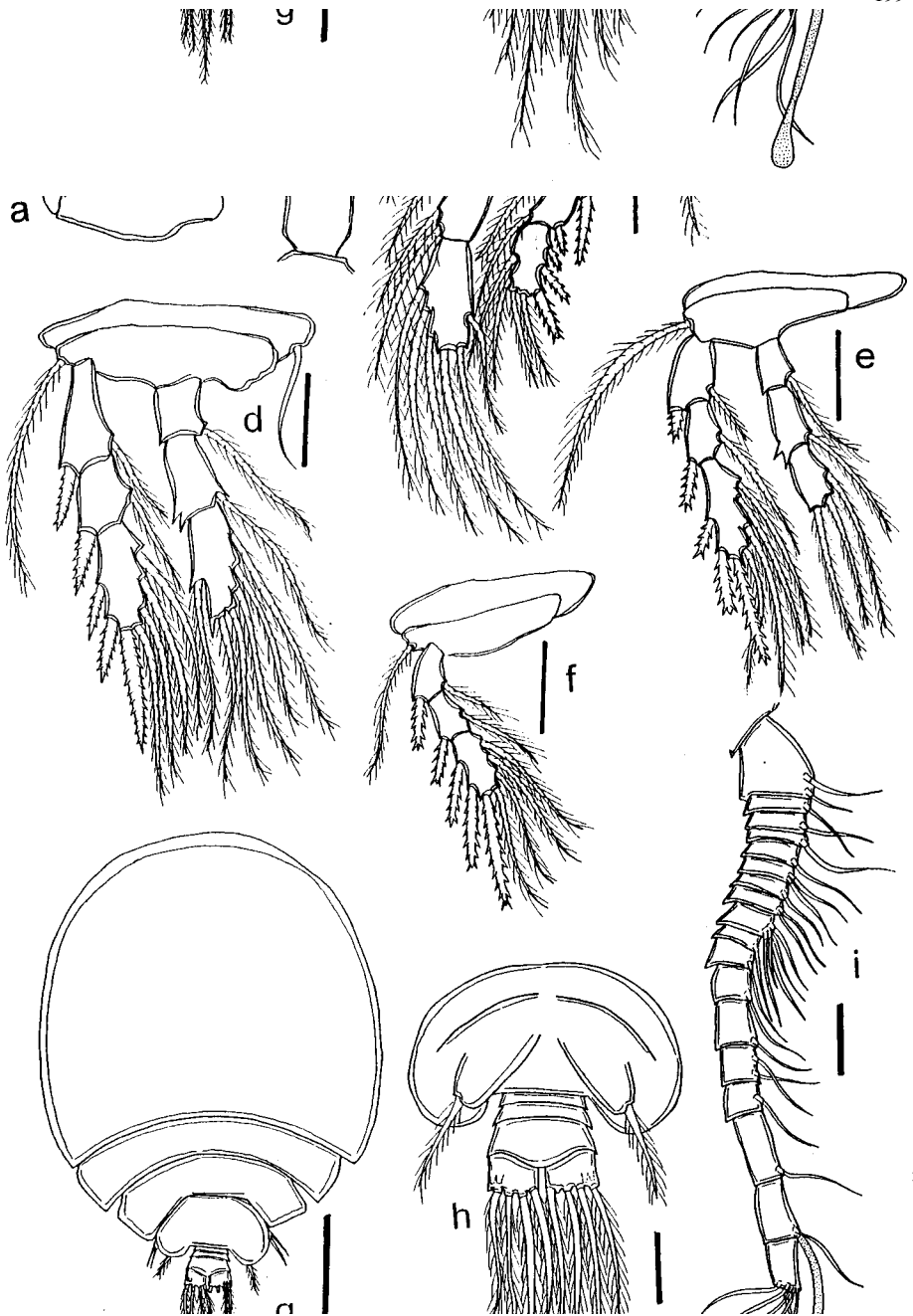


Figure 2. *Cletopontius titanus* new species. a–f, female holotype (MNRJ 8140): a, maxila; b, maxilliped; c, P1; d, P2; e, P3; f, P4; g–i, male paratype (MNRJ 8142): g, dorsal view; h, urosome; i, antennule. Scale bars = 0.02 mm, except “g” which = 0.1 mm.

*C. serratus* has both lobes of the maxillule armed with 4 setae, while in *C. titanus* the inner lobe is armed with 4 setae and the outer lobe 3 setae.

The exopod of P4 in *C. serratus* has the setal formula I-0; I-1; II-2 and *C. titanus* has I-1; I-1; III-4. Both species present the second endopodal segment of P3 armed with a single seta; *C. titanus* also shows this characteristic in the second endopodal segment of P2, however Thompson and Scott (1903) not describe the P2 of *C. serratus*.

Finally, the anal somite of *C. titanus* forms an elongate ventral plate that partially covers the caudal rami; this characteristic is apparently not present in *C. serratus*.

The genus *Cletopontius* had, until now, only one record, of female from the Indian Ocean (Thompson and Scott, 1903). The Brazilian species *C. titanus* is the second species of the genus, and the first occurrence in the Atlantic Ocean. These new records also include the first descriptions of the male *Cletopontius*.

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